IN THE CLAIMS:

The following is a complete listing of the claims pending in the present application:

1. (Withdrawn) A system for targeted sanguinous drug solution delivery to a target organ comprising:

a catheter inserted into a circulatory vessel proximal to said target organ;

a first pump that receives blood from a heart-lung machine and pumps a first metered amount of the blood through a first delivery line to said catheter;

a second pump that pumps a second metered amount of a second fluid through a second delivery line, separate from said first delivery line, to said catheter, wherein the second fluid contains medication;

a processor that controls said first and second pumps such that said second metered amount has a definable relationship to said first metered amount, wherein the first and second pumps deliver the blood and second fluid through said catheter directly to the target organ at the same time, and wherein only the target organ receives medication-containing blood, producing a local therapeutic effect on the target organ while minimizing systemic effects;

wherein the lumen of said first delivery line and the lumen of said second delivery line remain separate up to a connection point of said first and second delivery lines to said catheter, thereby minimizing reaction of the medication with the blood before delivery to the target organ.

2. (Canceled)

3. (Wihtdrawn) The drug delivery system of Claim 1, wherein the target organ is the heart.

4. (Withdrawn) The drug delivery system of Claim 1, wherein the first pump adds crystalloid solution to the blood.

5. (Withdrawn) The drug delivery system of Claim 1, wherein the second fluid contains adenosine.

6. (Withdrawn) The drug delivery system of Claim 1, further comprising a plurality of additional pumps pumping respective fluids under the control of said processor.

7. (Withdrawn) The drug delivery system of Claim 1, wherein said first pump is further configurable to combine a third metered amount of a third fluid with the blood and to pump both the blood and the third fluid into said first delivery line.

8. (Withdrawn) The drug delivery system of Claim 1, wherein the fluids are delivered at a controlled temperature and pressure.

9. (Withdrawn) The drug delivery system of Claim 1, wherein said processor receives feedback from monitors and can automatically alter operational parameters to meet predefined objectives.

10. (Withdrawn) The drug delivery system of Claim 1, wherein an operator can alter the definable relationship between said first metered amount and said second metered amount.

11. (Withdrawn) The drug delivery system of Claim 1, wherein the second delivery line contains a one-way check valve to prevent retrograde flow.

12. (Withdrawn) The drug delivery system of Claim 1, further comprising a temperature controller, configurable to provide heating or cooling to fluids in at least one of said first delivery tube and said second delivery line without contaminating the fluids.

13. (Withdrawn) The drug delivery system of Claim 1, further comprising a monitor to detect one or more conditions, the conditions including the rate of flow, the temperature, the pressure, and the concentration of a fluid within said pumping system.

14. (Withdrawn) The drug delivery system of Claim 1, further comprising a monitor to detect the temperature or blood pressure of a patient coupled to said pumping system.

15. (Withdrawn) The drug delivery system of Claim 1, wherein said processor is connected to control the activity of a portion of said clinical fluid pumping system.

16. (Withdrawn) The drug delivery system of Claim 15, wherein said processor is connected to control the operation of a valve.

17. (Withdrawn) The drug delivery system of Claim 15, wherein said processor is connected to control the speed of said first pump.

18. (Withdrawn) The drug delivery system of Claim 1, wherein said processor is connected to receive inputs from a monitor and to send signals to control a portion of said clinical fluid pumping system.

19. (Withdrawn) The drug delivery system of Claim 1, further comprising a display and control panel connected to provide information regarding the operation of said pumping system to a user and to accept input from the user.

20. (Canceled)

21. (Canceled)

22. (Withdrawn) The drug delivery system of Claim 1, wherein the second fluid is co-mingled with the blood no further from a target organ than 12 inches.

23. (Withdrawn) The drug delivery system of Claim 1, wherein said catheter is directly inserted into a circulatory vessel serving a target organ and has a single lumen.

24. (Withdrawn) The drug delivery system of Claim 1, wherein said catheter is inserted into a circulatory vessel remote from a target organ and maneuvered to the target organ, said catheter having multiple lumen.

25.-41. (Canceled)

42. (Previously presented) A method of providing targeted drug delivery to a target organ, said method comprising the steps of:

providing a fluid pumping system;

inserting a catheter into a circulatory vessel proximal to said target organ;

receiving a supply of a first fluid into said fluid pumping system;

pumping the first fluid at a measured rate to a first delivery line attached to said catheter;

metering and pumping a given amount of a second fluid to a second delivery line also attached to said catheter, wherein the second fluid contains medication and is delivered at a rate that is tied to the delivery rate of the first fluid; and

delivering said first and second fluids through said catheter directly to the target organ at the same time, wherein only the target organ receives medication-containing fluid, producing a local therapeutic effect on the target organ while minimizing systemic effects, and wherein the first fluid in said first delivery line and the second fluid in said second delivery line are not co-mingled at least until delivery into said catheter, thereby minimizing reaction of the medication with the first fluid before delivery to the target organ.

43. (Original) The method of Claim 42, further comprising the step of:

passing at least one of the fluids through a heat exchanger, whereby the at least one of the fluids is brought to a desired temperature prior to delivery to said catheter.

44. (Original) The method of Claim 42, further comprising the step of:

monitoring the temperature or pressure of a fluid within said fluid pumping system.

45. (Original) The method of Claim 42, further comprising the step of:

attaching a monitor to detect the temperature or blood pressure of a patient connected to said pumping system.

46. (Original) The method of Claim 42, further comprising the step of:

using a processor to control the activity of a portion of said fluid pumping system.

47. (Original) The method of Claim 46, wherein said processor controls a valve.

48. (Original) The method of Claim 46, wherein said processor controls the speed of a first pump in said pumping system.

49. (Original) The method of Claim 46, wherein said processor receives inputs from a monitor and automatically controls a portion of said fluid pumping system.

50. (Original) The method of Claim 42, further comprising the step of:

providing information regarding the operation of said pumping system to a display and accepting input from a user.

51. (Original) The method of Claim 42, wherein said receiving step receives a fluid comprising blood and said pumping step pumps adenosine.

52. (Original) The method of Claim 42, wherein said catheter is directly inserted into a circulatory vessel serving a target organ and has a single lumen.

53. (Original) The method of Claim 42, wherein said catheter is inserted into a circulatory vessel remote from a target organ and maneuvered to the target organ, said catheter having multiple lumen.

54. (Original) The method of Claim 42, wherein the second fluid is co-mingled with the first fluid no further from a target organ than 12 inches.

55. (Original) The method of Claim 42, further comprising at least one additional pump to pump a predetermined amount of a third fluid into said first delivery line.

56. (Original) The method of Claim 42, wherein the fluids are delivered at a controlled temperature and pressure.

57. (Original) The method of Claim 42, wherein an operator can alter the relationship between the delivery rate of the first fluid and the delivery rate of the second fluid.

58. (Original) The method of Claim 42, further comprising the step of providing a check valve in sad second delivery line to prevent retrograde flow of fluids in said second delivery line.

59. (Withdrawn) The drug delivery system of Claim 1, wherein said first delivery line and said second delivery line are separate lumen within a single tubing.

60. (Canceled)